

SECTION 5-3

SECTION SUMMARY

The Excretory System

Guide for Reading

- ◆ What is the function of the excretory system?
- ◆ How is urine produced in the kidneys' nephrons?
- ◆ In addition to the kidneys, what other organs play a role in excretion?

The excretory system is the system in the body that collects wastes produced by cells and removes the wastes from the body. The removal process is known as **excretion**.

The two **kidneys** are the major organs of the excretory system. The kidneys filter your blood and remove urea, excess water, and some other waste materials from your blood. **Urea** is a poisonous chemical that comes from the breakdown of proteins. The filtering process produces a watery fluid called **urine**.

Each kidney contains about a million nephrons. **Nephrons** are tiny structures that remove wastes from blood and produce urine. **Urine formation takes place in two stages. First, both wastes and needed materials, such as glucose, are removed from the blood. Second, much of the needed material is returned to the blood.**

In the first stage, blood enters the kidneys. The blood then flows through branching arteries into a cluster of capillaries in a nephron. The capillary cluster is surrounded by a capsule. In the capillaries, urea, water, glucose, and other substances move from the blood and into the capsule. From the capsule, the filtered substances pass into a long, twisting tube surrounded by other capillaries. As the filtered material moves through the tube, most of the water and glucose are reabsorbed into the blood. Most of the urea remains in the liquid.

After the reabsorbing process is complete, the liquid that remains in the tube is called urine. Urine flows from the kidneys through two narrow tubes called **ureters**. The ureters carry the urine to the **urinary bladder**, a sacklike muscular organ that stores urine. Urine flows from the body through a small tube called the **urethra**.

Some medical problems can be detected by analyzing the chemicals in urine. Glucose in the urine may indicate that a person has diabetes. Protein in urine can be a sign that the kidneys are not functioning properly.

The kidneys help maintain homeostasis by regulating the amount of water in your body. To help your kidneys maintain the proper water balance, you need to take in at least 2 liters of water a day.

The other organs of excretion are the lungs, skin and liver. When you exhale, carbon dioxide and some water are removed from the body. Sweat glands excrete water and some chemical wastes in perspiration. The liver breaks down some wastes so they can be excreted.

SECTION 5-3

REVIEW AND REINFORCE

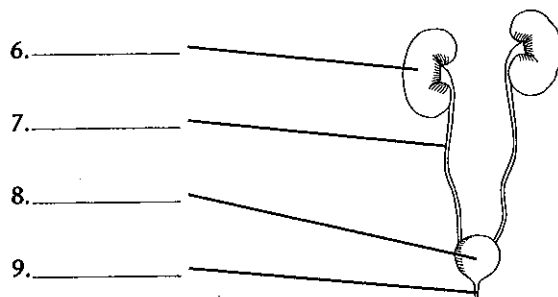
The Excretory System

◆ Understanding Main Ideas

Answer the following on a separate sheet of paper.

1. What are three substances that the excretory system removes from the body?
2. Describe the path of urine through the body from its formation to its elimination from the body.
3. What is the main organ of excretion? What are three other organs of excretion?
4. How do the kidneys maintain water balance in the body?
5. Where in the body are nephrons? Briefly describe the two-stage process in which they help to produce urine.

Label the diagram with the names of the parts of the excretory system.



◆ Building Vocabulary

Answer the following in the spaces provided.

10. What is excretion?

11. Compare and contrast the ureters and the urethra.

12. What is urea?

13. What is urine?

SECTION 5-3**ENRICH****Urinalysis**

As you learned in Section 3, an analysis of a urine sample can be useful in detecting some medical problems. The table below lists some common urine tests, their possible results, and what these results indicate.

Testing for the presence of protein, glucose, ketones, and nitrite involves chemical analysis. These tests are usually performed by dipping a special strip of paper or plastic called a dipstick into the urine. There is a special kind of dipstick for each type of test. If the dipstick changes color, the patient has the condition being tested for. Testing for the presence of red blood cells and white blood cells is performed by looking at a urine sample with a microscope. If red blood cells and white blood cells are present, they will be visible when the sample is magnified.

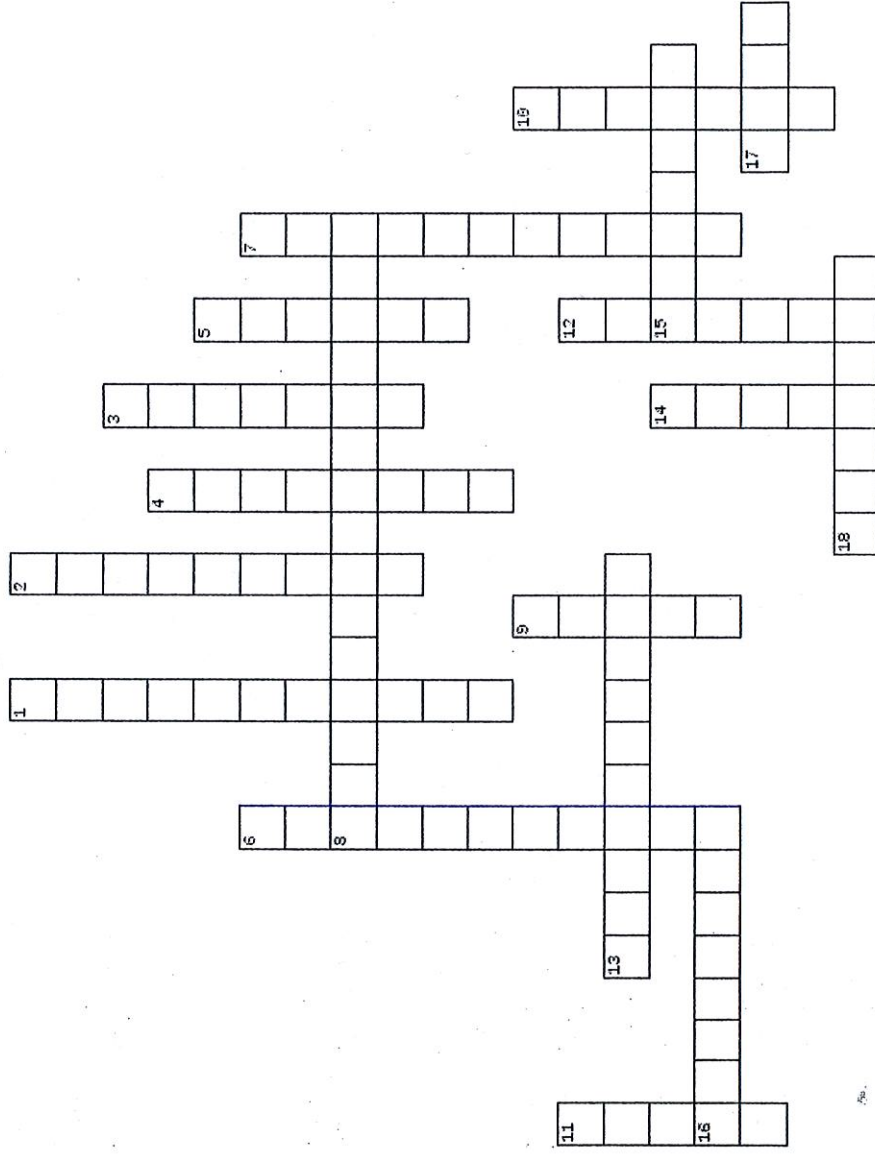
Test	Results	Condition Indicated by Test Results
color	pale to dark yellow	normal
	bright blue	presence of a drug
	foamy	presence of protein
	red or red-brown	presence of red blood cells
presence of protein	slight color change in dipstick	kidney disease
	major color change in dipstick	severe kidney disease
presence of glucose	dipstick changes color	diabetes
presence of ketones	dipstick changes color	severe diabetes
presence of nitrite	dipstick changes color	bacteria in urine (urinary infection)
presence of red blood cells	dipstick changes color	kidney disease
presence of white blood cells	dipstick changes color	bacteria in urine (urinary infection)

Answer the following questions on a separate sheet of paper.

1. A patient's urine tests positive for glucose and ketones. What do these results indicate?
2. The dipstick test for protein shows a slight color change. What does this indicate?
3. A patient's urine test shows the presence of nitrite. What condition does this indicate? What other test could you perform to confirm this result?
4. What should a doctor check in the urine of a person who might have kidney disease?
5. Dipstick tests for protein, glucose, and nitrite show no color change. What do these results indicate?

Excretory System (#2716234)

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Across Clues

8. Body system involved in removing waste products from body
13. Replacement of a diseased or damaged kidney by a healthy donated one
15. To release liquid wastes
16. Filtering units in the kidney, 1 million in each kidney
17. Chemical that comes from the breakdown of proteins
18. Storage tank for liquid wastes

Down Clues

1. blood reaches nephron through a cluster of _____
2. The removal process
3. Two bean-shaped organs that filter body fluids and produce urine
4. A procedure to filter blood when kidneys are not working properly
5. Transfers urine from kidneys to bladder
6. Excretory organs in skin
7. Regulation and stability of the body's inner environment
9. Organs that remove carbon dioxide
10. Tube that eliminates urine from the body
11. Fluid waste excreted by kidneys, commonly known as "pee"
12. Body's sugar, goes back into the blood stream
14. This must pass through the kidneys to be filtered of waste